

Related Appeals and Interferences

Appellant asserts that no other appeals or interferences are known to the Appellant, the Appellant's legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

Status of Claims

Claims 1-21 are pending in the application. Claims 1-21 were originally presented in the application. Claims 12-16 have been withdrawn from consideration. Claims 1-11 and 17-21 stand rejected in view of several references as discussed below. The rejection of claims 1-11 and 17-21 based on the cited references is appealed. The pending claims are shown in the attached Appendix.

Status of Amendments

No amendments to the claims were submitted after the final rejection. Arguments presented after final rejection were not accepted by the Examiner.

Summary of Invention

The present invention generally provides an apparatus for delivering processing gas from a vaporizer to a processing system. The apparatus comprises a valve (272, 274, 276) connected between the vaporizer (202, 204, 206) and the processing system, the valve having a valve input (293, 296, 299) connected to a vaporizer output (252, 254, 256) and a first valve output (291, 294, 297) connected to a processing system input (106) and a second valve output (292, 295, 298) connected to a bypass line (112), and a controller (116) for switching the valve between the first valve output and the second valve output (Figure 2, Paragraphs [0011], [0026]).

A second valve (262, 264, 266) connects the vaporizer (202, 204, 206) to a process carrier gas source (208) and to a divert carrier gas source (210). The process carrier gas source is connected to the second valve via valve inputs (281, 284, 287). The divert carrier gas source is connected to the second valve via valve inputs (282, 285, 288). The second valve is controlled by the controller (116) to switch between the valve inputs (281, 284, 287) for the process carrier gas source and the valve inputs

(282, 285, 288) for the divert carrier gas source (Figure 2, Paragraphs [0025], [0027], and [0028]).

The present invention further provides a method for delivering a processing gas from a vaporizer to a processing system. The method includes flowing a divert carrier gas and a processing gas into a vaporizer (202, 204, 206) and then into a bypass line (11) via the valve (272, 274, 276) having an input (293, 296, 299) connected to the vaporizer, an output (292, 295, 298) connected to the bypass line (112), and an output (291, 294, 297) connected to the processing system. Once the flow of processing gas is stabilized, the processing gas and a process carrier gas are flowed from the vaporizer into the processing system via the valve (272, 274, 276; Figure 2, Paragraphs [0029], [0030]).

Issues Presented

1. Whether the Examiner erred in rejecting claims 1-11 under 35 U.S.C. § 103(a) as being unpatentable over *Gauthier* in view of *King*.
2. Whether the Examiner erred in rejecting claims 17-21 under 35 U.S.C. § 103(a) as being unpatentable over *Gauthier* in view of *King*.

Grouping of Claims

Pending claims 1-11 and 17-21 do not stand or fall together for all arguments presented by Applicants. Applicants' first argument relates to the first issue for claims 1-11, and claim 1 is representative of the claims. Applicants' second argument relates to the second issue for claims 17-21, and claim 17 is representative of the claims.

ARGUMENT

I. THE EXAMINER ERRED IN REJECTING CLAIMS 1-11 UNDER 35 U.S.C. § 103(A) BECAUSE *GAUTHIER* IN VIEW OF *KING* FAILS TO TEACH, SHOW, OR SUGGEST A VALVE CONNECTED BETWEEN A VAPORIZER AND A PROCESSING SYSTEM, THE VALVE HAVING A VALVE INPUT CONNECTED TO A VAPORIZER OUTPUT AND A FIRST VALVE OUTPUT CONNECTED TO A

PROCESSING SYSTEM INPUT AND A SECOND VALVE OUTPUT CONNECTED TO A BYPASS LINE, AND A CONTROLLER FOR SWITCHING THE VALVE BETWEEN THE FIRST VALVE OUTPUT AND THE SECOND VALVE OUTPUT, AS RECITED IN CLAIM 1.

Claims 1-11 stand rejected under 35 U.S.C. § 103(a) over *Gauthier* (U.S. Patent No. 6,007,330) in view of *King* (U.S. Patent No. 4,263,091) on grounds that *Gauthier* provides an apparatus that includes a valve (174) having a valve input (122/174) connected to a vaporizer output and a first valve output (174/130) connected to a processing system input (176) and a second valve output connected to a bypass line, and that it would have been obvious to use the three-way electrically controlled valves of *King* in the apparatus of *Gauthier*. Applicants respectfully traverse this rejection.

Gauthier describes an apparatus (100) that delivers gases from a vaporizer to a processing chamber. The apparatus includes a valve (174) between vaporizer (122) and processing chamber (130). *Gauthier* describes flow of a liquid precursor from the vaporizer into valve (174) or flow of a gas or fluid from input (176) into valve (174). *Gauthier* describes flow out of valve (174) into injectors within the processing chamber (130) (column 6, lines 1-5). Thus, *Gauthier* describes valve (174) as having two inputs and one output.

The Examiner asserts that *Gauthier* teaches, shows, and suggests that three-way valve (176/174) can be an output to the vaporizer as is demonstrated by the recycle line that is not labeled connecting valve (174) and vaporizer (122). Applicants respectfully submit that *Gauthier* does not teach, show, or suggest that input (176) is capable of functioning as an output connected to vaporizer (122). *Gauthier* describes introducing carrier gases (156), dopants (146), or other liquids directly into the vaporizer (122) via port (134) and directly into chamber (130) via input (176) (column 5, line 41 to column 6, line 5). Even if valves (160), (152), and (142) were closed, gases would not flow out of input (176) back to the vaporizer (122), as the valve (174) is necessarily at a lower pressure than the vaporizer (122). Gases from the vaporizer, are flowed through pressure reducing valve (170) to valve (174) via valve input (176) and then into the chamber (130). The chamber pressure will be less than the valve (174) pressure. The pressure at the inlet (134) to the vaporizer has to be greater than the valve (174)

pressure, so fluid through input (176) can only flow into valve (174), and cannot flow out. There is no suggestion or motivation in *Gauthier* to modify apparatus (100) such that gases that are vaporized in the vaporizer (122) and passed through the valve (174) could be returned through the port (134) to the vaporizer (122) via input (176). As input (176) of *Gauthier* is incapable of functioning as an output, valve (174) is not a valve connected between a vaporizer and a processing system, the valve having a valve input connected to a vaporizer output and a first valve output connected to a processing system input and a second valve output connected to a bypass line. Valve (174) is only shown and described as having an input from the vaporizer, input (176), and an output to the chamber (130).

Applicants further submit that *King* does not teach, show, or suggest a controller for switching a valve between a first valve output and a second valve output. *King* provides a logic device (59) that generates signals to fully open or fully close the three-way valves (31-34) (Figure 1, column 3, lines 48-64). Figure 1 of *King* shows an input from the feed stream, an input from the purge gas, and an output to the powder form evaporator for each three-way valve. Neither *Gauthier* nor *King* provides or motivates a controller for switching a valve between a first valve output and a second valve output.

Thus, Applicants submit that *Gauthier*, alone or in combination with *King*, does not teach, show, or suggest an apparatus for delivering processing gas from a vaporizer to a processing system, comprising a valve connected between the vaporizer and the processing system, the valve having a valve input connected to a vaporizer output and a first valve output connected to a processing system input and a second valve output connected to a bypass line, and a controller for switching the valve between the first valve output and the second valve output, as recited in claim 1. Applicants respectfully request withdrawal of the rejection of claim 1 and of claims 2-11, which depend thereon.

II. THE EXAMINER ERRED IN REJECTING CLAIMS 17-21 UNDER 35 U.S.C. § 103(A) BECAUSE GAUTHIER IN VIEW OF KING FAILS TO TEACH, SHOW, OR SUGGEST A VALVE MEANS FOR SELECTIVELY DELIVERING GAS TO A PROCESSING SYSTEM INPUT AND TO A BYPASS LINE, THE VALVE MEANS CONNECTED BETWEEN A VAPORIZER AND THE PROCESSING SYSTEM, AND A

CONTROLLER MEANS FOR SWITCHING THE VALVE MEANS BETWEEN THE PROCESSING SYSTEM INPUT AND TO A BYPASS LINE, AS RECITED IN CLAIM 17.

Claims 17-21 stand rejected under 35 U.S.C. § 103(a) over *Gauthier* (U.S. Patent No. 6,007,330) in view of *King* (U.S. Patent No. 4,263,091) on grounds that *Gauthier* provides an apparatus that includes a valve (174) having a valve input (122/174) connected to a vaporizer output and a first valve output (174/130) connected to a processing system input (176) and a second valve output connected to a bypass line, and that it would have been obvious to use the three-way electrically controlled valves of *King* in the apparatus of *Gauthier*. Applicants respectfully traverse this rejection.

Applicants submit that *Gauthier* does not provide or suggest a valve means for selectively delivering gas to a processing system input and to a bypass line, wherein the valve means is connected between the vaporizer and the processing system. Valve (174) of *Gauthier* provides a means for delivering gas from vaporizer (122) or from gas sources (156), (146), or (160) to chamber (130). Even if the line connected to input (176) of valve (174) is considered a bypass line, *Gauthier* does not provide a valve means for selectively delivering gas to an input of chamber (130) and to the bypass line. Gases would not flow out of input (176) into the bypass line back to the vaporizer, as the valve (174) is necessarily at a lower pressure than the vaporizer (122). As discussed in the first argument, as valve (174) only allows gases to flow out of the valve into chamber (130), valve (174) cannot function as a valve means for selectively delivering gas to a processing system input and to a bypass line.

Applicants further submit that *King* does not provide a controller means for switching a valve means between a processing system input and to a bypass line. *King* provides a logic device (59) that generates signals to fully open or fully close the three-way valves (31-34) (Figure 1, column 3, lines 48-64). Figure 1 of *King* shows an input from the feed stream, an input from the purge gas, and an output to the powder form evaporator for each three-way valve. Neither *Gauthier* nor *King* provides or motivates controller means for switching a valve means between a processing system input and to a bypass line.

Thus, Applicants submit that *Gauthier*, alone or in combination with *King*, does not teach, show, or suggest an apparatus for delivering processing gas from a vaporizer to a processing system, comprising a valve means for selectively delivering gas to a processing system input and to a bypass line, the valve means connected between the vaporizer and the processing system, and a controller means for switching the valve means between the processing system input and to a bypass line, as recited in claim 17. Applicants respectfully request withdrawal of the rejection of claim 17 and of claims 18-21, which depend thereon.

Conclusion

In conclusion, *Gauthier* and *King*, alone, or in combination, do not teach, show, or suggest an apparatus for delivering processing gas from a vaporizer to a processing system, comprising a valve connected between the vaporizer and the processing system, the valve having a valve input connected to a vaporizer output and a first valve output connected to a processing system input and a second valve output connected to a bypass line, and a controller for switching the valve between the first valve output and the second valve output. Furthermore, *Gauthier* and *King*, alone, or in combination, do not teach, show, or suggest an apparatus for delivering processing gas from a vaporizer to a processing system, comprising a valve means for selectively delivering gas to a processing system input and to a bypass line, the valve means connected between the vaporizer and the processing system, and a controller means for switching the valve means between the processing system input and to a bypass line. Therefore, it is believed that the rejections made by the Examiner should be reversed. Thus, Applicants respectfully request reversal of the rejection and allowance of claims 1-11 and 17-21.

Respectfully submitted,



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APPENDIX

1. (Original) An apparatus for delivering processing gas from a vaporizer to a processing system, comprising:
 - a valve connected between the vaporizer and the processing system, the valve having a valve input connected to a vaporizer output and a first valve output connected to a processing system input and a second valve output connected to a bypass line; and
 - a controller for switching the valve between the first valve output and the second valve output.
2. (Original) The apparatus of claim 1, further comprising:
 - a second valve connected between a carrier gas source, a divert gas source and the vaporizer, the second valve having a first valve input connected to the carrier gas source, a second valve input connected to the divert gas source, and a valve output connected to a vaporizer input.
3. (Original) The apparatus of claim 2, wherein the controller is connected to switch the second valve between the first valve input and the second valve input.
4. (Previously Presented) The apparatus of claim 3, wherein the controller is connected to correspondingly switch the valve and the second valve.
5. (Previously Presented) An apparatus for processing a substrate, comprising:
 - a chamber having a gas input;
 - a vaporizer;
 - a valve connected between the vaporizer and the chamber, the valve having a valve input connected to a vaporizer output and a first valve output connected to the gas input and a second valve output connected to a bypass line; and
 - a controller for switching the valve between the first valve output and the second valve output.

6. (Original) The apparatus of claim 5, further comprising:
a second valve connected between a carrier gas source, a divert gas source and the vaporizer, the second valve having a first valve input connected to the carrier gas source, a second valve input connected to the divert gas source, and a valve output connected to a vaporizer input.
7. (Previously Presented) The apparatus of claim 5, further comprising:
at least one intermediate valve connected between a gas source and the valve.
8. (Previously Presented) The apparatus of claim 7, wherein the gas source comprises a plurality of gas supplies.
9. (Previously Presented) The apparatus of claim 5, further comprising:
at least one input valve connected between a gas source and the valve, the input valve having a plurality of inputs selectably connected to a plurality of gas supplies of the gas source and an output connected to the valve input.
10. (Previously Presented) The apparatus of claim 9, wherein the controller is connected to switch the input valve between a first valve input of the plurality of inputs and a second valve input of the plurality of inputs.
11. (Previously Presented) The apparatus of claim 10, wherein the controller is connected to correspondingly switch the valve and the input valve.
12. (Withdrawn) A method for delivering processing gas from a vaporizer to a processing system, comprising:
connecting a valve between the vaporizer and the processing system, the valve having a valve input connected to a vaporizer output and a first valve output connected to a processing system input and a second valve output connected to a bypass line; and
selectively switching the valve between the first valve output and the second valve output.

13. (Withdrawn) The method of claim 12, further comprising:
stabilizing a vaporizer output before switching the valve to the first valve output.
14. (Withdrawn) The method of claim 12, further comprising:
initiating vaporization of a source material before a vaporized gas of the source material is needed for processing while the valve is switched to the second valve output;
and
switching the valve to the first valve output when the vaporized gas of the source material is needed for processing.
15. (Withdrawn) The method of claim 12, further comprising:
connecting a second valve between a carrier gas source, a divert gas source and the vaporizer, the second valve having a first valve input connected to the carrier gas source, a second valve input connected to the divert gas source, and a valve output connected to a vaporizer input; and
selectively switching the second valve between the first valve input and the second valve input.
16. (Withdrawn) The method of claim 15 wherein the first and second valves are correspondingly switched.
17. (Original) An apparatus for delivering processing gas from a vaporizer to a processing system, comprising:
a valve means for selectively delivering gas to a processing system input and to a bypass line, the valve means connected between the vaporizer and the processing system; and
a controller means for switching the valve means between the processing system input and to a bypass line.

18. (Original) The apparatus of claim 17 wherein the valve means comprises a valve having a valve input connected to a vaporizer output and a first valve output connected to a processing system input and a second valve output connected to a bypass line.

19. (Original) The apparatus of claim 18, further comprising:

a second valve means connected between a carrier gas source, a divert gas source and the vaporizer, the second valve means having a first valve input connected to the carrier gas source, a second valve input connected to the divert gas source, and a valve output connected to a vaporizer input.

20. (Previously Presented) The apparatus of claim 19 wherein the controller means is connected to switch the second valve means between the first valve input and the second valve input.

21. (Previously Presented) The apparatus of claim 20, wherein the controller means is connected to correspondingly switch the valve means and the second valve means.